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Studies on the Nemic-fauna of Soil of the Mulberry Plant Field in Kyushu

IV. On the Host plant of Pin Nematode, *Paratylenchus aciculus* BROWN, 1959

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Introduction

We are now studying the nemic fauna of soil of the mulberry plant field, and detected a pin nematode, *Paratylenchus aciculus* BROWN, 1959, as a more important plant parasitic nematode in Kyushu which Yokoo reported in 1969.

We studied the method of culture of this species, and examined the life history in the culture agar water, in which the seedlings of mulberry plant and another host, red clover, were grown.

Pin nematodes are small type species of the plant parasitic nematodes. It is known that life cycle of these species are very different from another plant parasitic nematodes, and specific preadult (young female) and mature female can be recognized in thier life cycle.

Therefore the isolation of nematodes from soil for the collection of this species in the culture agar water was discussed. We discussed the suitable isolating method of the young female for inoculation. And we examined the host range of this species by inoculation of nematodes isolated by the suitable method for the young female.

Materials and Methods

1. Isolation method of nematodes from soil and roots:

We compared the efficiency of isolation of nematodes from soil or root by Bearmann's method with the centrifugal floatation technique. In Baermann's method, the soil (50 g) and the short cutted roots in about 1 cm in length were treated in the chamber regulated at 25°C for 48 hrs, and examined the nematodes. The diameter of root of mulberry plant was below 1.85 mm. In Centrifugal floatation technique the short cutted roots were washed by the strong current water water througth 100 meshes-sieve, and the water flowed about througth these 100 meshes-sieve were again poured into 325 meshes sieve. And we translated the debris on the surface of sieve to centrifugal tubes, were treated by centrifugal floatation technique, and examined the numbers of nematodes.

2. The examination of the host range of *Paratylenchus aciculus*:

We filled the small sands disinfected by autoclave in the plastic cups (capacity, 180 cc.). And we sowed the seeds or the cutting and bulb of plants. Several seedlings were grown per cup. We inoculated about 400 nematodes isolated by Baermann's method to each cup. Four cups were used respectively for one host. On fifty days after inoculation nematodes were isolated from sand by the Baermann's method and from root by the centrifugal floatation technique; isolation procedure of the former method was repeated four times and once for the latter on each cup. The centrifugal floatation technique was used as follows: 2500 rpm; first for 5 minutes, and after addition of sugar solution (500g /1 lit.) for 1 minute.

Results

1. The mature female could not be isolated by Baermann's method in case of either soil or roots as shown in Table 1.

Table 1. Baermann's method

Stage	Samples from Soil (50 g)	Samples from Root (5 g)
Larvae Young females Males	8748	2261
Mature females	0	0

2. Any stages of larvae, young female and mature female could be isolated by the centrifugal floatation method as shown in Table 2.

Table 2. Centrifugal floatation method.

Stage	Samples from Soil (50 g)	Samples from Root (5 g)
Larvae Young females Males	3144	369
Mature females	39	111

3. Mature females were isolated by centrifugal floatation technique of residues in the funnel used in Baermann's method as shown in Table 3.

Table 3. Baermann's method and Centrifugal floatation method.

Stage	Samples from Soil (50g)	Samples from Root (5 g)
Larvae Young female Males	672	226
Mature females	11	70

4. Host plant of *Paratylenchus aciculus*

We examined the 14 species of plant and obtained the following result as shown in Table 4.

Discussion

Discussing from these data as shown in Table 1–3, the efficiency of isolation of nematodes by Baermann's method seems to be better than that by centrifugal floatation technique in case of isolation of larvae, young females, and males of *Paratylenchu aciculus*, but by Baermann's method mature females could not be isolated.

Therefore the centrifugal floatation technique seems to be necessary for the isolation

Table 4. Host plant.

	Host plants	*Young females Males,	**Mature females	***F/I
1.	Soy Bean (*Glycine max* (*L.*) MERILL)	4283	238	11. 30
2.	Mulberry (*Morus bombycis* KOIDZ)	3275	31	8. 27
3.	Kidney Bean (*Phaseols vulgaris* L.)	742	246	2. 47
4.	Ped Clover (*Trifolium prvtense* L.)	888	27	2. 29
5.	Carrot (*Daucus earota* (*L.*) *var. sativa* DC.)	762	11	1. 93
6.	Cucumber (*Cucmis sativas* L.)	198	5	0. 50
7.	Alfalfa (*Medicago sativa* L.)	96	5	0. 25
8.	Upland Rice (*Oryza sativa* L.)	65	0	0. 16
9.	Garlic (*Allium sativum* L.)	48	0	0. 12
10.	Sweet Potato (*Ipomoea batatas* POIRET)	44	0	0. 11
11.	Tbacco (*Ncotiana tabacum* L.)	37	0	0. 09
12.	Barley (*Hordium vulgare* L.)	23	0	0. 06
13.	Chainese Cabbage (*Brassica pekinensis* RUPR.)	21	0	0. 05
14.	Tomato (*Lycopersicum esculenta* MILL.)	13	0	0. 03

* Total numbers of nematodes isolated by Baermann's method

** Total numbers of nematodes isolated by Centrifugal floatation technique.

*** F/I; Final population/Initial population

of mature female of this species.

In 1959 BROWN found first this species from the soil around the roots of *Poa palustris* L. (Fowl blue grass) and soil of pasture in Ontario. In 1962 RASKI found this species from the soil around the roots of *Pinus virginiana* in Maryland, and of grass and *Mesembryanthemum* sp. in California. And in 1963 BRZESKY and SZCYZYGIEL found this species from the soil around the roots of strawberry and alfalfa in Poland. Recentry GERAERT (1965) found this species from the soil around the roots of coffee tree in Surinam (Guiana, South America), and YOKOO(1969) found it from the soil around the roots of mulberry plant in Kyushu (Japan).

Considering from these data on distribution, this species seems to be cosmopolitan species, and host range seems to be comparativelly wide. Discussing from Table 4, plant No. 1–7 seem to be host plants of this species. Of all these host plants Soy bean and mulberry plant can be especially recognized as the suitable host plants.

Plants No. 8–14 can be discussed to be attacked by this species, but are independent from multiplication, because of lack of mature female adult.

Summary

This paper reports the result of investigation on the isolation technique of *Paratylenchus aciculus* from soil around the roots and from the parasitized roots by this nematode. Centrifugal floatation technique is necessary for isolation of mature female of this species. And we tried the inoculation experiment of this species to about 14 species of plants. Seven species of plants can be considered to be host plants, and out of them Soybean and mulberry plants are more suitable host plants.

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